

New Queensland Loricates.

(Phylum Mollusca, Order Loricata).

By A. F. BASSET HULL.

(Read before the Royal Society of Queensland, 26th May, 1924.)

(Plate XXI.)

NARRATIVE.

By courtesy of the Queensland Government I was invited to accompany the members of the Pan-Pacific Science Congress who were about to visit the Great Barrier Reef, travelling with them as far as Mackay. While the main party were out in the s.s. "Relief" I collected Loricates on the mainland littoral between Mackay and Townsville. As some slight recognition of the facilities afforded me by the State, the types of the new species described in this paper are deposited in the Queensland Museum, Brisbane.

Arriving at Mackay on 12th September, 1923, I proceeded to Slade Point, north of the mouth of the Pioneer River. Here I spent the night at Mr. George Harrison's seaside camp, and at dawn the next morning took advantage of the low tide and searched the rocks. The shore is muddy sand, with numerous small stones, the debris from the igneous intrusions upon the coal measures of which the country rock is formed. Along the beach these stones were waterworn and smooth or covered with small rock oysters, and only one Loricata, a dirty weed-covered *Haploplax arbutum* Reeve, was found. The rocky headland looked more promising, and as might have been expected, *Liolophura queenslandica* Pilsbry was found in immense numbers in the crevices and on the lower valves of dead oysters adhering to the surface of the rock between median and high tide marks, the bulk of the shells being greatly eroded. One specimen of *Onithochiton quercinus* Gould was taken in the same zone. As the tide receded I waded into the deeper rock pools and examined hundreds of loose stones, with the surprisingly poor result of a single specimen of *Callistochiton antiquus* Reeve, no trace of any other species being found. This was most disappointing, as the pools were deep, well sheltered, and full of algal growth. The tide was very low, and about 100 yards from the outermost fringe of rocks a sand-bank surrounded the whole point, enclosing a wide stretch of sheltered water, in which were many loose stones embedded in the muddy sand and covered with weed. Limpets and barnacles were plentiful, but although an hour was spent in diligently exploring about 400 yards along the shore under ideal conditions, favourable to the requirements of the most exigent Loricata, not another specimen was found, the net result being four species of four genera, three species being represented by single specimens only, and the other being the common Loricata of the Queensland coast, present in multitudes.

I returned to Mackay and took steamer to Townsville, arriving there on the 14th. The shore in the vicinity of the town is muddy sand. There is a high bluff of porphyry at Kissing Point, but little debris at the foot and, the tide not serving, I did not collect there. On the 15th I went across to Magnetic Island, arriving there at 4 p.m. The tide was falling, and I went to the rocks at the east end of Picnic Beach. Here huge granite boulders project into the water, and the old hulk of an iron vessel lies close to the rocks. Both boulders and ship were covered with oysters nearly to high water mark. Between the wreck and an old jetty about the middle of the beach there is a large area of sandy flat, mostly exposed at low tide, and sparsely sprinkled with small stones, dead coral, and portions of an old coral reef, dead and disintegrating. I collected over this area on the 15th and on the 16th September. From the rocks and wreck I took numerous examples of *Liolophura queenslandica* Pilsbry, a few medium to small sized specimens of *Amphitomura gemmata* Blainville, and eleven specimens of *Squamopleura curtisiana* Smith. The two former species were evidently sedentary, wedged into crevices or between or inside the valves of the thickly clustering oysters, their girdles distorted to fit the irregularities of their environment; while the lastnamed species were evidently mobile, looking fresh and alert and moving when touched. On the flat area I found numerous specimens of *Ischnochiton luticolens* Hull and *Haploplax arbutum* Reeve, the former on rough granite fragments, dead coral or smooth stones; the latter principally on smooth stones and old bottles. On a piece of rough granite I found an *Acanthochiton* belonging to the same beautifully figured and sculptured group as *A. granostriatus* Pilsbry; this shell I am describing in this paper, the name, *A. complanatus*, referring to the remarkable flattened pustules with which it is sculptured. Seven specimens were taken, all within an area of a few square yards.

On the 17th September I left Townsville for Bowen. Here I was fortunate in meeting Mr. E. R. Rainford, who kindly placed himself and his excellent boat at my disposal for two days, and without whose assistance I would have been unable to do any collecting, there being no boats for hire in Port Denison. On the 18th we went to North Head, where a long sand-bank stretches from the rocky headland, on which the lighthouse is erected, towards the shore. The sides of this bank were thickly strewn with debris from the granitic and dioritic rocks of the vicinity. Here we found *Ischnochiton luticolens* and *Haploplax arbutum* in moderate quantity, both on the under side and at the edge of insertion in the sand of loose stones, besides in several cases on living or dead shells of the large *Pinna*. Three specimens of another *Ischnochiton*, which I am describing and naming *I. distigmatus*, were found. Mr. Rainford found the first of a new species of *Lucilina*, which I have much pleasure in naming after him; about twenty specimens of this shell were taken in all. Several specimens of *Callistochiton antiquus* Reeve, two *Acanthochiton complanatus*, and two *A. variabilis* Ad. & Angas, were also taken. The main rocks were cursorily inspected, but only a single *Liolophura queenslandica* was found. On the following day we sailed across to Stone Island and anchored off a long sandspit on the eastern side of the island. This spit was covered with rocky debris, piled up on both

sides but covered at high tide. Along the shore of the bay, which terminated in a rocky low headland, there was a wide stretch of coral sand with scattered stones and shingle partly embedded in it. Nearly every stone examined on the flat yielded a single *I. luticolens* or *H. arbutum*, and on the under side of some smooth stones embedded with loose pieces of coral in the sand I found a most interesting new genus and species of *Plaxiphoridae*, a quite unlooked-for discovery, no species of the family having been recorded from tropical Queensland. On searching the low headland, Mr. Rainford found a fine example of *Callistochiton granifer* and three specimens of *Rhyssoptax particolor*, two species recently described by me from Palm Islands and Caloundra, Q., respectively. As the rising tide drove us from the flat we examined the rocks on the spit, taking several fine examples of *Amphitomura gemmata* Blv.

SPECIES OF LORICATES COLLECTED.

1. ISCHNOCHITON LUTICOLENS.

Ischnochiton luticolens Hull, Aust. Zool., iii. 159 (1923).

Plentiful at Magnetic Island, Townsville, North Head and Stone Island (Port Denison). (Type locality: Port Curtis, Q.)

2. ISCHNOCHITON DISTIGMATUS, n. sp.

(Plate XXI, Fig. 1.)

Shell small, elongated oval, not carinated. Colour purplish-brown when alive; much of the purple disappears when the shell is dry; a dark purple spot on each side of the jugum near the posterior margin of valve iv. The sculpture of the whole shell is finely granulose, graduated in quincunx. The lateral areas of the median valves are raised, but there is no differentiation in the sculpture.

Posterior valve larger than the anterior, with mucro rounded, slightly in front of the middle, posterior slope convex. Girdle densely packed with small, elongated, lozenge-shaped scales directed backward and outward, not striated; on the underside there are closely packed spicules, radiating outwards from the sutural margins to the outer edge of the girdle.

Interior, bluish-white; anterior valve interiorly grooved and with about 9 rudimentary slits, median valves 1-1 (in one case there are two obscure slits on one side), posterior valve crenulated but unslit.

Dimensions.—8 x 4½ mm.

Station.—On the under side of small stones embedded in the sand between median and low water mark.

Locality.—North Head, Port Denison, Q.

Material.—Three examples.

Remarks.—This shell is easily distinguishable from *I. luticolens* Hull, with which it is associated, by the absence of any marked differentiation in the sculpture on the lateral areas; the uniform colouration, and the shape of

the posterior valve, which in *I. luticolens* has the mucro considerably in front of the middle and the posterior slope concave. It differs from *I. gabrieli* Hull in the obscurely slit median valves. It appears to be a degenerate species, the insertion plates and slitting becoming obsolete, and the girdle scales approaching the elongated spiculose character of those of the *Lepidopleuridae*.

3. HAPLOPLAX ARBUTUM.

Chiton arbutum Reeve, Conch. Icon, iv, pl. xxiv, fig. 162 (1847).

Plentiful at Magnetic Island, Townsville; North Head and Stone Island, Port Denison; rare at Slade Point, Mackay, Q.

4. CALLISTOCHITON ANTIQUUS.

Chiton antiquus Reeve, Conch. Icon, iv, pl. xxv, fig. 169 (1847).

Chiton antiquus Reeve, Smith, Zool. Coll. "Alert," 79 (1884) Port Molle (Coppinger).

Not found at Magnetic Island; eight examples at North Head, Port Denison; one example at Slade Point, Mackay.

5. CALLISTOCHITON GRANIFER.

Callistochiton granifer Hull, Aust. Zool., iii, 161 (1923).

A single specimen of this rare species was taken by Mr. Rainford at Stone Island, Port Denison.

6. ACANTHOCHITON COMPLANATUS, n. sp.

(Plate XXI, Figs. 2, 2A, 2B, 2C.)

Shell medium, elevated, carinated, side-slopes convex. Colour variable; the type shell has a creamy ground, greenish on the jugum, and each valve is strongly marked with irregular zigzag lines in greenish-black, as depicted in figure 2. Other shells are suffused with emerald green or brown.

The sculpture is similar on all valves, consisting of numerous almost circular flat-topped pustules, increasing in size towards the margins.

Anterior valve rounded, not trilobed, with apex almost smooth.

Median valves; lateral areas not differentiated, no diagonal; jugum broad, V-shaped, with the pustules very small and crowded.

Posterior valve small, rounded, the pustules smaller and tending to a more regular pattern than on the other valves; mucro prominent, posterior, straight behind.

Girdle densely clothed with short transparent spicules, seven large tufts of long spicules on each side, opposite the sutures, and four smaller tufts in front of the anterior valve.

Interior bluish-white; anterior valve with five slits, median valves 1-1 slit, and posterior valve with two slits.

Dimensions.—15 x 8 mm.

Station.—Under small stones embedded in coral sand.

Locality.—Magnetic Island, Townsville (type); North Head and Stone Island, Port Denison.

Material.—Magnetic Island, 7, Stone Island, 3, North Head, 6 examples.

Remarks.—Differs from *A. granostriatus* Pilsbry in the flattened, circular pustules. Differs from *A. shirleyi* Ashby in the regular, more closely packed and flattened pustules, and the elevated nature of the shell. Smith (Zool. Coll. Alert, 1884) recorded a shell from Port Molle under the name of *A. asbestoides*. Iredale informs me that he has seen the shell in question, which was collected by Dr. Coppinger of the "Alert," and he considers it probably conspecific with the shell above described. It certainly was not *A. asbestoides*, the type locality of which is Flinders Island, Bass Strait.

7. ACANTHOCHITON VARIABILIS.

Hanleya variabilis Ad. & Ang., P.Z.S., 1864, p. 194.

Nine examples were taken at Stone Island, and two at North Head, Port Denison.

AERILAMMA, n. gen.

Shells of small dimensions and tropical distribution, having Plaxiphorid structure, but primitive ornament, and a girdle covered with minute scales, bearing sparse corneous processes, and with spiculose margins. Colour resembling oxidised bronze.

8. *Type*: AERILAMMA PRIMORDIA, n. sp.

(Plate XXI, Fig. 4.)

Shell very small for the family, broadly ovate, not elevated, but carinated; side-slopes convex. Colour olive-green, unevenly flecked with reddish-brown and blotched with dark green. The sculpture of the whole shell is uniformly granulose, the grains somewhat irregular in shape and size, but all high and rounded.

Anterior valve broad and high, apex not beaked, planate.

Median valves; lateral areas distinctly raised, not differentiated; beaks prominent on valves ii to iv; grains on the jugum smaller and more crowded.

Posterior valve; mucro small, posterior, not prominent; post-mucronal area indicated by a slightly raised rib.

Girdle wide, covered with minute, elongate, rounded scales, and having a few corneous tufts opposite the sutures; margin spiculose, the under side densely minutely scaly.

Interior blue, paler on the edges and the sutural laminae; anterior valve with 8 slits, median valves 1-1 slit, posterior valve unslit; callus wide, smooth; eaves projecting; sinus broad.

Dimensions.—7 x 5 mm. (type). Largest example taken 11 x 7 mm. The measurements are of dried specimens, the girdle contracting to less than one-third of the width of the living shell.

Station.—On the under side of smooth stones embedded in coral sand and debris, between median and low water mark.

Locality.—Stone Island, Port Denison, Queensland.

Material.—Seven examples.

Remarks.—The discovery of this shell is of great interest, the nearest recorded occurrence of a Plaxiphorid in Queensland being at Caloundra, 50 miles north of the Brisbane River, while Port Denison is nearly 700 miles further north. The southern record is of *Poneroplax (Plaxiphora) pæteliana* Thiele, a large species which attains a length of 80 mm. on the coast of New South Wales. As indicated by the specific name proposed, *A. primordia* is primitive in its sculpture, and resembles in this respect *Plaxiphora parva* Nierstrasz (Beit. zur Kenntnis der Fauna von Sud-Afrika, Zool. Jahrb. 1906, 501), and *P. indica* Thiele (Rev. des Systems der Chitonen, Chun. Zool., 1909, 23). The former shell is from Mozambique; its dimensions are $5 \times 3\frac{1}{4}$ mm., and the colour "white, red, or grey, flecked with black." The figure indicates a more elongate shell than *A. primordia*, but the granuloſe sculpture is similar, although less uniform. Thiele's shell is from Ceylon; his type is $8 \times 5\frac{1}{2}$ mm., colour "brown flecked with green." I have an example from the type locality, 15 mm. in length, in which the sculpture tends to radial arrangement, but otherwise is in agreement with that of *A. primordia*. These two species, placed by their authors in the genus *Plaxiphora*, appear to fall into the same genus as the Queensland shell, both having *scaly girdles*. The *Plaxiphoridae* are primarily of Antarctic distribution, being found from the Falkland Islands to the sub-Antarctic islands of New Zealand, where they assume heroic proportions. The completion of the trinity—African, Indian, and Australian—of tropical degenerate forms, furnishes another remarkable item of evidence in support of the theory of the northward migration and synchronous degeneration of Antarctic fauna. *Vide* my paper on the occurrence of the crested penguin in Australia, Rec. Aust. Mus. xii, 79 (1918).

9. RHYSSOPLAX [PARTICOLOR.

Rhyssoplax particolor Hull, Aust. Zool., iii, 165 (1923).

Three examples collected by Mr. Rainford at Stone Island, Port Denison.

10. SQUAMOPLEURA CURTISIANA.

Chiton (Ischnochiton) curtisianus Smith, Zool. Coll. "Alert," 78 (1884).

Eleven examples of this shell were collected at Magnetic Island from the wreck of an iron steamer. Oysters were clustered thickly along the sides of this wreck, and in the early morning the Squamopleuras were crawling about the oysters.

11. AMPHITOMURA GEMMATA.

Chiton gemmatus Blainville, Diet. Sci. Nat. xxxvi, 544 (1825).

Amphitomura gemmata Blainville, Iredale, P.Z.S., 1914, 669.

Amphitomuras were fairly common on the wreck and rocks at Magnetic Island, but small shells predominated. On a rocky spit at Stone Island some

large examples were taken, and also some of remarkably fine condition as regards sculpture. The examination of these and numerous examples from other parts of the Queensland coast, Torres Strait, and North Western Australia leads me to conclude that there are many varieties, subspecies, or even valid species of the genus. Ashby has suggested the varietal name of *queenslandica* for the shell from Dunk Island, Queensland¹, but as there are several names available if Queensland shells are to be separated from Torres Strait and Western Australian shells, I prefer to await a more critical examination of material before definitely accepting or rejecting Ashby's suggested name. It may be noted that the foot of the animal when alive is orange-red.

12. LIOLOPHURA QUEENSLANDICA.

Liolophura gaimardi queenslandica Pilsbry, Proc. Acad. Nat. Sci. Philad., 1894, 87.

Liolophura gaimardi, var. *queenslandica* Pilsbry, Hedley, A.A.A.S., 1909, 352.

Liolophura queenslandica Pilsbry, Hull, Aust. Zool., iii, 199 (1923).

This is the common shell of the southern coast of Queensland, which I first found associating with the preceding species on the rocks of Facing Island, Port Curtis. It occupies the same zone, and accommodates itself to the irregularities of the rock surface, oysters, and other encrusting growths, in the same manner as the *Amphitomura*. The foot of *Liolophura* is generally of a pale yellow colour. I found it plentiful on the rocks and wreck at Magnetic Island, rather scarce at Port Denison (but further search will probably result in its discovery in quantity), and very plentiful at Slade Point, Mackay.

13. ONITHOCHITON QUERCINUS.

Onithochiton quercinus Gould, Proc. Bost. Soc. Nat. Hist., ii, 142 (1846), New South Wales.

This is one of the commonest shells inhabiting the surface of the rocks between high and median tide marks on the coast of New South Wales and Southern Queensland. I found only a single example at Point Slade, Mackay, and none at either Port Denison or Magnetic Island.

14. LUCILINA RAINFORDIANA, n. sp.

(Plate XXI, Fig. 3.)

Shell medium, elevated, carinated, side-slopes very slightly convex. Colour very variable, brilliant when alive, in most instances fading to dull brown, red or green when dry. The type shell is pale brown, flecked with red, especially on the jugum; valves ii and viii greenish-black with a light stripe on the jugum; central areas of valves iii to vii greenish.

Anterior valve with eleven radiating grooves, the interspaces filled by 4-5 imbricating pustules with the apices directed backward.

Ocelli visible all over the valve.

Median valves with lateral areas strongly differentiated, covered with three radiating rows of large flattened imbricating pustules, the central row smaller than the two outer ones. Central areas having 10-12 high curved

¹ Journ. and Proc. Roy. Soc. W.A., viii, 30 (1921-2).

riblets, the bases corresponding with the anterior row of pustules on the lateral areas, and curving inwards to the jugum; ocelli visible on all the valves, mostly scattered along the grooves in the lateral areas.

Posterior valve; mucro very prominent, posterior, nearly straight behind; ante-mucronal area similar to central areas of median valves, with ocelli visible between the riblets; post-mucronal area densely covered with small rounded pustules.

Girdle wide, spongy, densely covered with minute, short, chaffy spicules.

Interior bluish-white. Anterior valve with 8 slits, teeth very finely pectinated and exteriorly crenulated; median valves 1-1 slit; posterior valve with 12-13 slits, teeth short, broad, coarsely pectinated and externally crenulated. Sinus broad, finely pectinated.

Dimensions.—Type, $15 \times 7\frac{1}{2}$ mm. Some examples were taken measuring 20×12 mm.

Station.—On the under side or at the edge of insertion in sand of stones and dead coral, in coral sand below low-water mark.

Locality.—North Head, Port Denison.

Material.—About 20 examples.

Remarks.—This is a very striking shell, brilliant and variably coloured when alive, and having a very strong sculpture, easily distinguishable from that of any other member of the genus. In the juvenile shell the apical half of the anterior valve is smooth, and there are only three concentric rows of flattened pustules; the sculpture of the lateral areas of the median valves consists of two rows of pustules only, obscure in the very young shells, with a smooth area between. In the senile shell the rows of pustules on the anterior valve and the lateral areas of the median valves show a tendency to increase by division towards the margin.

I have much pleasure in associating this shell with Mr. E. H. Rainford, of Bowen, whose kindly assistance enabled me to obtain this and other interesting Loricates at Port Denison.

EXPLANATION OF PLATE XXI.

Fig. 1.—*Ischnochiton distigmatus*, n. sp.

Fig. 2.—*Acanthochiton complanatus*, n. sp. Colour pattern.

Fig. 2a.—*Acanthochiton complanatus*. Anterior valve.

Fig. 2b.—*Acanthochiton complanatus*. Median valve.

Fig. 2c.—*Acanthochiton complanatus*. Posterior valve.

Fig. 3.—*Lucilina rainfordiana*, n. sp.

Fig. 4.—*Aerilamma primordia*, n. sp.